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TITLE: Two-Sided Roll Support with Multiple Ribs

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TWO-SIDED ROLL SUPPORT WITH MULTIPLE RIBS

Background Of The Invention

1. Field of the Invention.

5 The present invention relates to structures for the packaging of cylindrical structures. More particularly, the present invention relates to fabricated supports for stabilizing the position of cylindrical structures, such as rolls of material, and other structures having at least some cylindrical features, during transport.

10 2. Description of the Prior Art.

Web materials such as plastic film are used for a variety of purposes including the sealing of other materials. Web materials are typically fabricated in roll form and used in their particular applications in the same form. However, such cylindrical products are often difficult to transport because they can become displaced relatively easily when subject to the conditions of roadway travel. In addition, it is undesirable to stack heavy cylindrical objects directly on one another because their weight can cause deformation. For that reason, cylindrical objects such as web rolls are ordinarily retained by supports that space adjacent ones apart and prevent rolling movement. Such supports must be fabricated so that product damage is minimized. Failure to minimize damage during transport can cause defects that prevent use of the product for its intended purpose. Further, since it is most efficient to stack multiple layers of product for a single transport effort, the support must be strong enough to enable multi-layered stacking that does not cause product deformation.

25 Some supports for cylindrical products have been fabricated of polystyrene. The polystyrene supports generally provide sufficient strength to adequately protect a plurality of web rolls, for example, stacked together for transport. However, it is well known that polystyrene and other polymeric-based products are generally perceived as environmentally undesirable in that they are 30 stable and unlikely to degrade over a long period. For that reason, there has been increasing interest in fabricating such web supports, and other sorts of

packaging for that matter, that are fabricated of more nature-friendly materials, including recyclable materials, including pulp-based supports. Examples of molded pulp supports are described in U.S. Patent Nos. 5,899,331 and 5,934,467. Those references describe molded roll supports having recesses and 5 depressions that provide structural strength to the rolls and that also provide retention sites for cradling the rolls to be transported.

For the most part, the present molded supports have only one side (the smooth side) configured to support products having cylindrical characteristics, while the other side (the rough side) is designed to provide suitable structural 10 support. In order to enable multi-layer stacking, the molded supports are formed of pairs of support structures hingedly connected together so that the smooth sides face outwardly while the rough sides are placed back-to-back. In that way, the rolls to be supported come in contact only with the smooth sides of the double, hinged, support.

15 Unfortunately, the supports that presently exist are not completely effective in preventing roll damage during transport. Specifically, the support materials have some compressibility so that when a plurality of relatively heavy objects are placed on them, there is some thickness reduction. In addition, it is ordinary practice for transporters to place banding straps around the perimeter of a stack 20 of objects. The banding is tightened to prevent individual objects in the stack from slipping. However, that tightening causes additional compression of the support material, particularly the hinged support structures. During transport, that additional compression that occurs after banding can result in less than complete retention of individual objects. As a result, the banding is loosened and the 25 objects are prone to spinning and other forms of displacement that can cause in damage.

Therefore, what is needed is a cylindrical object support that provides suitable retention capability to minimize object movement throughout the transport process. What is also needed is such an object support that can be fabricated of 30 conventional materials including, but not limited to, pulp-based materials. Further, what is needed is such an object support that can be used to retain multiple

stacks of objects with a reduction in the types of compressive characteristics experienced by hinged supports.

Summary Of The Invention

- 5 It is an object of the present invention to provide a cylindrical object support that provides suitable retention capability to minimize object movement throughout the transport process. It is also an object of the present invention to provide such an object support that can be fabricated of conventional materials including, but not limited to, pulp-based materials. Further, it is another object of
10 the present invention to provide such an object support that can be used to retain multiple stacks of objects with a reduction in the types of compressive characteristics experienced by hinged supports.

- These and other objects of the present invention are achieved through the unique design of a cylindrical object support formed in a single layer and
15 providing greater surface contact area between the support and the objects to be supported. The support of the present invention has a first support surface and a second support surface. The support is an elongated member having a pair of rib regions running parallel to one another on the first support surface. The ribs each include alternating arches and depressions, terminating at the ends of the
20 elongate member with terminating arches that act to prevent end rolls from falling off. The terminating arches remain part of opposing end walls that define the end perimeter of the elongated member. The ribs are spaced from one another by an inner valley and each of the ribs of the first side is adjacent to an outer valley that are adjacent to side walls of the first side.
25 On the second side of the elongated member, the valleys of the first side are three ribs in parallel that are also configured as respective series of alternating arches and depressions. The depressions of the ribs of the first side define the positioning of the underside of a web product to be retained by the support on that side. For that reason, the depressions of the parallel ribs are
30 aligned. Similarly, the depressions of the second side are designed to retain the topside of a web product and so are also aligned. In particular, the arches of the

first side substantially define the configuration of the depressions of the second side and the depressions of the first side substantially define the configuration of the arches of the second side. The combination of multiple ribs on the first side and multiple ribs on the second side result in a single-piece web support that

5 retains adjacent sets of objects on each of its sides. The arches of the ribs are preferably of height greater than existing support structures to ensure no slip-out of objects during transit. That is, they provide more surface area contact with the object along a greater extent of the circumference of the object. In addition, the support of the present invention is relatively wider than corresponding supports
10 for equivalent objects. The combination of the relatively taller rib arches and wider structure adds to the overall critical surface area contact between the support and the objects being supported. For the purpose of this disclosure, the critical surface area is that area of contact associated with the interface between the support and where adjacent objects are stacked atop one another.

15 In order to further minimize the possibility of loosening of a banded stack of objects, the present invention includes lands at the tops of the arches of the ribs of the first side. The lands are preferably configured with cavities that reinforce the structural strength of the land that defines the upper dimensions of the arches.

Specifically, while a flat land provides some structural strength to the ribs, adding

20 a cavity to a land increases the transverse strength by effectively adding more surface area to the lands within the same space. The cavities essentially create two lands rather than a single land component. Adjacent objects positioned on the first side of the support meet substantially greater resistance to inward movement due to the cavity-inclusive configuration of the lands. That ensures
25 that the adjacent objects are much less likely to move inwardly toward the middle of the stack due to excessive compression of the support in that localized region.

The present invention provides an improved object support that enables the stacking and retention of cylindrical and semi-cylindrical objects without resorting to hinged or otherwise double-configured structures. These and other
30 advantages of the present invention will become apparent upon review of the following detailed description, the accompanying drawings, and the claims.

Brief Description of the Drawings

FIG. 1 is a simplified perspective view of the first side of the support of the present invention shown on a plurality of rolls supported by the second side thereof.

FIG. 2 is a simplified perspective view of the second side of the support of the present invention shown without the plurality of rolls thereon.

Detailed Description Of The Preferred Embodiment Of The Invention

An object support structure 10 of the present invention is shown in FIGS. 1 and 2. The structure includes a first side 11 and an opposing second side 12. Either or both of the two sides may be molded with a smooth design or a rough design. The structure 10 is preferably fabricated of moldable pulp fiber material but may also be fabricated on non-metallic polymeric material, such as plastic sheet, for example. The structure 10 is of selectable length L and width W sufficient to ensure that two spaced rib sections may be established on said first side 11. The first side 11 includes opposing first sidewalls 13 and 14 and two opposing endwalls 15 and 16. The sidewalls and endwalls define the perimeter of the elongate structure that is the roll support structure 10.

The structure 10 includes on the first side 11 a first rib section 17 and a second rib section 18 that is substantially parallel to the first rib section 17. The first rib section 17 and the second rib section 18 are spaced apart from one another by an inner valley 19 and they are spaced from the sidewalls 13 and 14 by outer valleys 20 and 21, respectively. All of the valleys are preferably of substantially the same configuration. Each of the rib sections 17 and 18 includes an alternating series of two or more interior arches 22 and semi-cylindrical depressions 23. The arches 22 and the depressions 23 are preferably sized and configured to retain securely within the depressions 23 rolls 24 so that the contact area of the depressions 23 to the rolls 24 is substantial. Although rolls of web material are shown being retained by the support 10, it is to be understood that the support 10 may be employed to retain other objects having cylindrical design.

Continuing with the example, for a roll having a diameter D, the completed circle defined by the circumference of the depressions 23 preferably has a diameter greater than D and the arches 22 are of a height sufficient to produce adequate contact with the rolls 24. For example, for a roll having a diameter 5 equal to about 10", the arches 22 should be at a height of at least about 1.75". It is to be noted that at least the depressions 23 of the respective rib sections 17 and 18 are to be substantially aligned with one another so that the rolls 24 may reside therein.

With continuing reference to FIG. 1, the first side 11 of the structure 10 further includes a first set of end arches 25 and a second set of end arches 26 that are adjacent to and form a part of endwalls 15 and 16, respectively. They are 10 preferably about the same height as the arches 22, but in some instances may be taller if desired. Additionally, the inner arches 22 preferably each includes a land 27 that defines the height of the respective inner arches. Each land 27 provides structural reinforcement to the rib sections 17 and 18 and has a substantially 15 centered cavity 28 spaced between two top sections of the individual lands 27. These cavities 28 enhance the structural characteristics of the individual arches 22, preventing excessive compression of that portion of the structure 10, particularly in the center of the structure 10 during full loading.

As illustrated in FIG. 2, the second side 12 of the structure 10 is a modified inverted version of the first side 11. In particular, the second side 12 includes a set of parallel rib sections 29-31 that correspond to the valleys 19-21 of the first side 11. The rib sections 29-31 include a series of alternating peaks 32 and depressions 33. Although the peaks 32 may have lands, they do not in the 20 preferred embodiment of the present invention, as that would affect the design of the first side 11 to an extent. The second side 12 is designed to retain within the aligned depressions 33 what would effectively be the topside of the rolls 24, essentially as shown in FIG. 1. On the other hand, the first side 11 is designed to retain thereon the underside of the rolls 24. The peaks 32 are sufficiently sized in 25 height to aid in retaining the rolls within the depressions 33. It is to be noted that the rib sections 29-31 are spaced apart from one another by second side valleys 30

that correspond to the underside configuration of the arches **22** and their lands **27** of the first side **11**. The structure **10** of the present invention is relatively wider than corresponding supports of the prior art to ensure that multiple ribs may be fabricated into the second side **12**. That wider design in combination with
5 relatively taller ribs produces substantially greater critical surface area contact of the structure **10** with whatever objects are being supported thereon.

The roll support structure **10** of the present invention provides an improved support that enables the stacking and retention of cylindrical objects without resorting to double-configured structures. The structure **10** is formed of a single
10 layer and improved structural features to minimize compression and increase surface area contact. While the invention has been described with reference to a particular example embodiment, it is intended to cover all modifications and equivalents as described in the following claims.

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